

R E M A R K S

The specification has been amended at p. 7, lines 28-30, by inserting the numbers of the U.S. patents that have respectively issued on the three applications there cited. This amendment overcomes the objection set forth in numbered paragraph 6 on p. 4 of the aforementioned Office Action.

Since the present Amendment does not increase either the total number of claims or the number of independent claims, no additional fee is necessary.

Claims 1 - 28 are in the application. All the claims have been rejected under 35 U.S.C. §103(a) as unpatentable over Mendlein et al. in view of Van der Spiegel et al. Stated briefly, it is the Examiner's position, as understood, that Mendlein et al. teaches a method and apparatus for determining bone characteristics by steps and structures using a pair of ultrasonic transducers made of polyvinylidene fluoride; that Van der Spiegel et al. teaches use of a piezoelectric transducer made of copolymer including P(VDF-TrFE) for enhancing piezoelectric activity; and that since both Mendlein et al. and Van der Spiegel et al. are in the field of "uses of piezoelectric transducer for ultrasound medical systems and methods," it would have been obvious "to modify Mendlein's transducer such that it includes a copolymer of piezoelectric materials in order to enhance the piezoelectric activity . . ." (Office Action, pp. 3-4). The Examiner further asserts that additional limitations recited in particular claims are "either obviously met by the disclosure or well known in the art of ultrasonic measurement systems."

As the Office Action states, the pertinence of Mendlein et al. to applicants' claimed invention lies in its disclosure of methods and apparatus for determining bone characteristics, such as by speed of sound (SOS) and broadband ultrasonic attenuation (BUA) measurements (see Mendlein et al., e.g. at col. 14, lines 1-4). In sharp contrast, Van der Spiegel et al. is concerned with ultrasound imaging (col. 1, line 11), stating that "The ferroelectric sensors of this invention provide better acoustic imaging of body tissue" (col. 7, lines 28-30; see also col. 1, line 63, and col. 2, lines 29-30).

Thus, even if in a very broad sense both patents are directed to "uses of piezoelectric transducer for ultrasound medical systems and methods," as the Examiner asserts, nevertheless they are concerned with quite different specific fields of endeavor within that broad ambit -- SOS and BUA measurements of bone on the one hand, body tissue imaging on the other. Consequently, it would not be obvious, to a person of ordinary skill in the art, that a material disclosed as advantageous or suitable for use in transducers in one of these fields would be advantageous or suitable for the other.

In this regard, it may further be noted that Van der Spiegel et al. appears to be directed exclusively to sensors, wherein a copolymer film is deposited on a first surface of semiconductor transistor means. Mendlein et al. requires transducers that transmit an ultrasonic signal as well as transducers that detect an ultrasonic signal; this is true, as well, of applicants' claimed apparatus and method. Van der Spiegel et al. does not suggest that the copolymer material there described would be suitable for such purposes. Moreover, in described embodiments of applicants' transducers, the copolymer is not deposited on a

surface of transistor means, and may, for example, be laminated in plural layers adhered by epoxy (specification, p. 19, lines 26-28), whereas in Van der Spiegel et al., emphasis is placed on the advantage of avoiding the need for epoxy glue to adhere the film to a transistor chip (col. 1, line 48 - col. 2, line 40). These considerations illustrate the differences in field of use between Van der Spiegel et al., on the one hand, and Mendlein et al. and applicants' claimed invention on the other.

Therefore, it is submitted that each of independent claims 1, 10, 18, 23 and 25 distinguishes patentably over Mendlein et al. and Van der Spiegel et al. as applied, i.e., because it would not have been obvious from the two references, considered together, to use the copolymer of Van der Spiegel et al. in the apparatus or method of Mendlein et al. The other claims are submitted to be likewise allowable by virtue of their dependence on one or another of these independent claims.

In addition, it is submitted that a number of the claims present further patentable distinctions over the applied references. Thus, claims 2 - 9, 11, 12, 20, 22 and 27 require that the transducer that transmits ultrasonic energy through an animal portion comprises a piezoelectric copolymer transducer. Van der Spiegel et al. does not suggest that a copolymer could be used in a transducer for transmitting ultrasonic energy through an animal portion in any device or method, and hence would not make obvious such use of a copolymer in an ultrasonic energy transmitting transducer in Mendlein et al.

Claims 3, 5 and 12 specify that the or each copolymer transducer comprises a copolymer disk and further includes rigid support structure engaging the disk surface that faces away from

the animal portion for supporting the disk against pressure exerted on the disk. No such arrangement, and no such structure, is found in either Mendlein et al. or Van der Spiegel et al.; therefore, it is submitted, no combination of the references could make these features obvious.

Claim 4 recites that a device for coupling the transducers ultrasonically to the animal portion comprises a pair of pads respectively disposed in contact with the copolymer transducers and respectively engageable with opposed surface regions of the animal portion, while claim 5 defines the combination of these pads with the aforementioned copolymer disks and rigid support structure. No such pads, and no such combinations of structural features, are found in either of the applied references. Consequently, it is not seen that these features could be obvious from the two references, taken together.

To the Examiner's assertion that the features of the dependent claims "are either obviously met by the disclosure or well known in the art of ultrasonic measurement systems," applicants respond that the features just discussed are not disclosed in the applied references; and while some components of these features may be individually found elsewhere (for instance, coupling pads are shown in U.S. patent No. 5,755,228, cited in the present specification e.g. at p. 15, line 15), there is nothing to make obvious their combination with copolymer transducers as defined in the aforementioned claims.

Finally, referring to the patents made of record and not relied on, applicants submit that none of these citations adds anything to Van der Spiegel et al. with respect to the use of copolymer transducers in bone testing apparatus and methods.

Again it is noted that at least two of the cited patents (Toda and Shimoda et al.) are too recent in date to be citable as references against the present application.

For the foregoing reasons, it is believed that this application is now in condition for allowance. Favorable action thereon is accordingly courteously requested.

Respectfully,

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I hereby certify that this paper is being deposited this date with the U.S. Postal Service as first class mail addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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